Development of an Environmental Measurement System to Track Mercury Contamination and Management in New England

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Fundamentals for Performance Measures

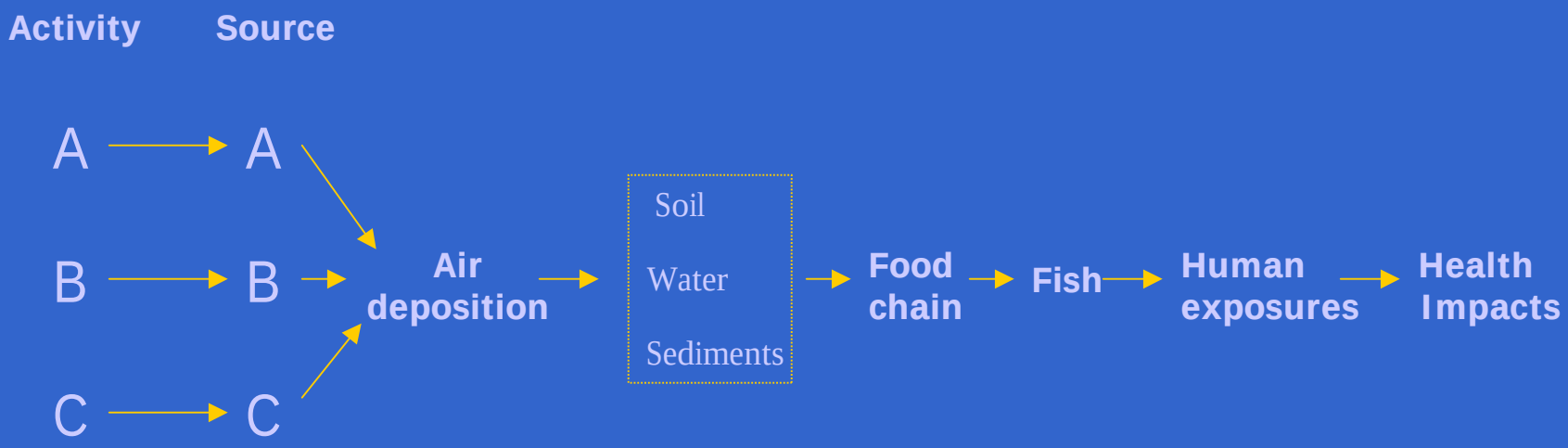
- Measures should link activities to environmental objectives
- Mechanisms are necessary to review the measures and make policy or program determination

Objectives for Mercury Program (*you* decide)

- Reduce emission of Hg
- Reduce exposure to Hg
- Implement strategies for Hg management
- Reduce impacts from Hg

Example: Reduce emission of Hg

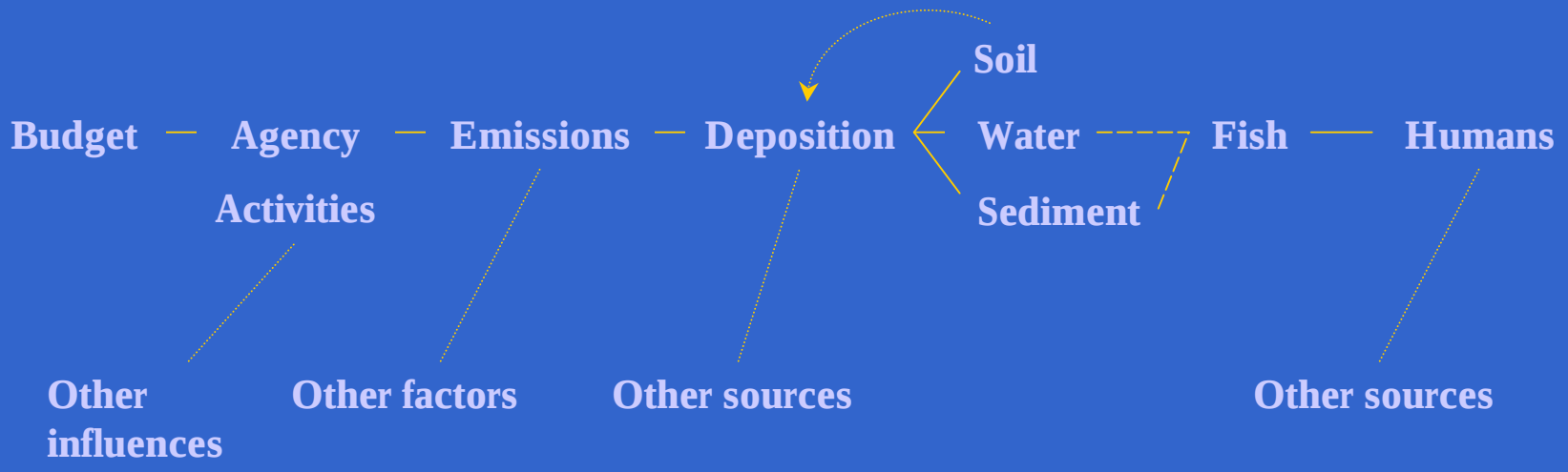
Mapping the issue connecting agency activities to environmental outcomes



Issue Map


Budget
Agency Activities
Emissions
Deposition
Soil
Water
Sediment
Fish
Humans

Issue Map


Budget
Agency
Activities
Emissions
Deposition
Soil
Water
Sediment
Fish
Humans
Other influences
Other factors
Other sources
Other sources

Framework & Process for Selecting Hg Indicators

Figure 1 illustrates the basic framework NEGIP used for selecting progress measures to support the Mercury Action Plan[1]. *Activities* undertaken to reduce mercury in the region are expected to affect regional *releases*, which in turn are expected to affect *environmental conditions.* For example, the collection of mercury-containing wastes (an activity) is expected to affect the quantity of Hg emitted from solid waste incinerators (a release) which should ultimately affect concentrations in fish and other biota (an environmental condition).

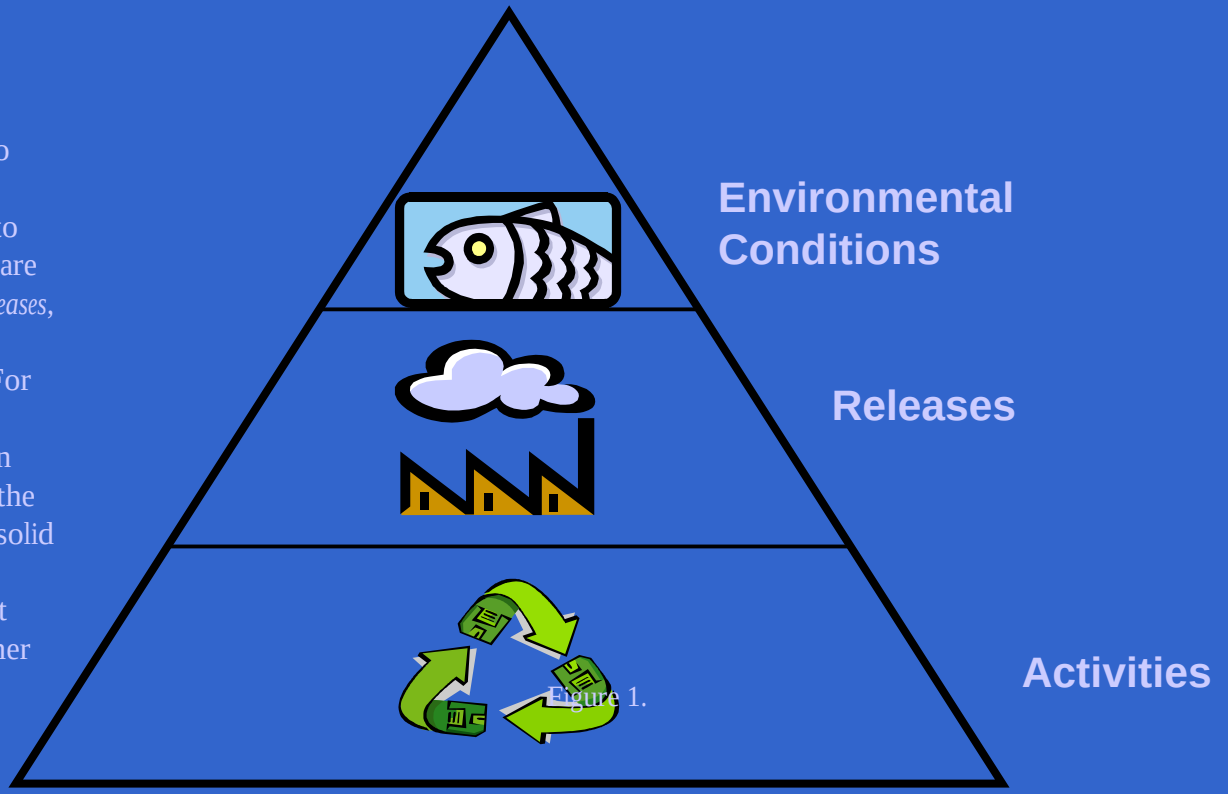


Figure 1.

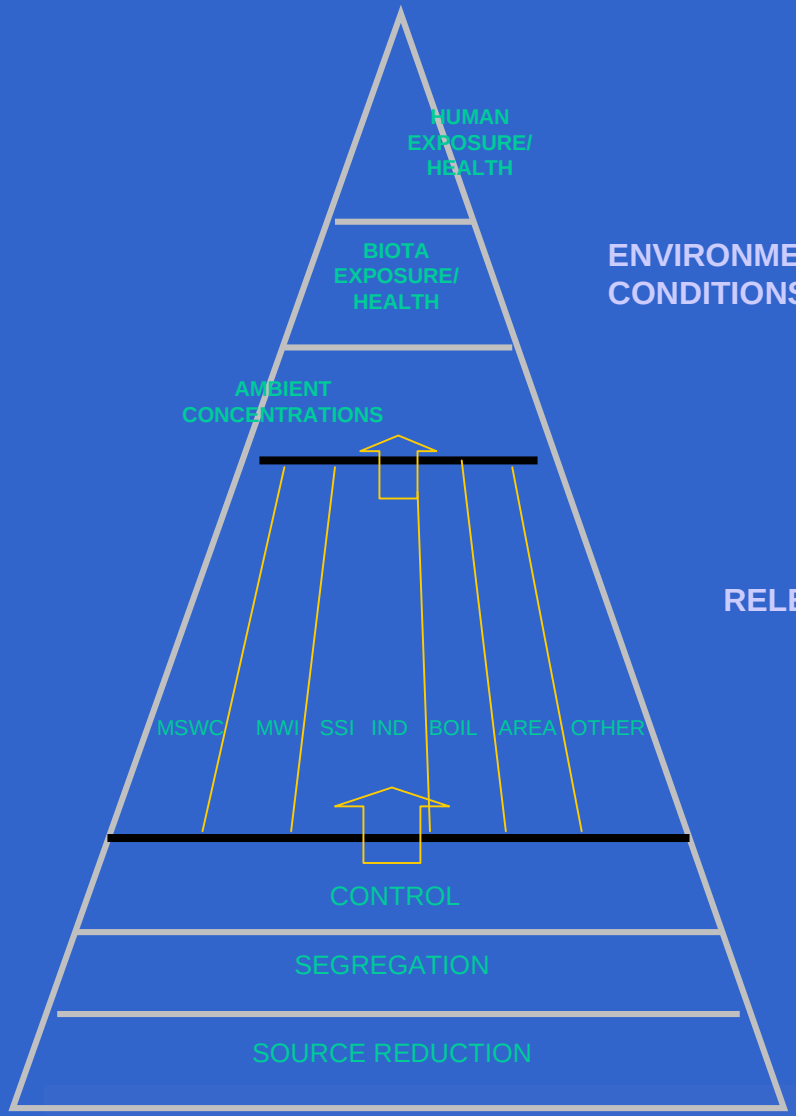
Steps to Make Indicators Real

- Data screening
- Assigning responsibility

Data Collection Sample

Releases							
Municipal Waste Combustors:	Municipal solid waste is comprised mostly of household garbage and commercial, industrial, and institutional waste. Sources of mercury include batteries, switches, bulbs, paint residues, plastics, and electrical equipment (NESCAUM 1997). Recent efforts to reduce mercury in batteries is suspected to have a significant impact on mercury from MWCs. Emissions data for MWCs in the past has relied on a combination of emission factor approaches and extrapolation from stack test data. Not all states have regular stack test data available for all facilities. In the best of cases, approximately one tack test per facility is available per year. If the data are reliable, these annual stack tests perhaps offer a glimpse of progress at a select subset of facilities. In states such as Maine and Massachusetts where every MWC facility has stack test data available, it may be possible to estimate annual emissions and changes in annual emissions with greater accuracy than with emission factor methods alone.						
	Connecticut	**Maine**	**Massachusetts**	**New Hampshire**	**Rhode Island**	**Vermont**	**Region**
❋ Stack Hg Concentrations	Stack test data for each of Connecticut's Resource Recovery Facilities is available, but CT does not seem to have any MWCs.	Maine has 4 MWCs, each of which has been stack tested every 12-18 months, for the last 10 years.	Every MWC facility in Massachusetts is tested approximately every 9 months.	Each of New Hampshire's 2 largest MWCs has had 3-4 tests during the last 7 years (roughly 93, 98, 00). Of NH's ~7-8 smaller MWCs, only 1 has been tested.	No MSW facilities in RI.	No MSW facilities in VT.	
❋ Total Annual Emissions			MA estimates a 3 year rolling average emission		No facilities in RI.	No facilities in VT.	

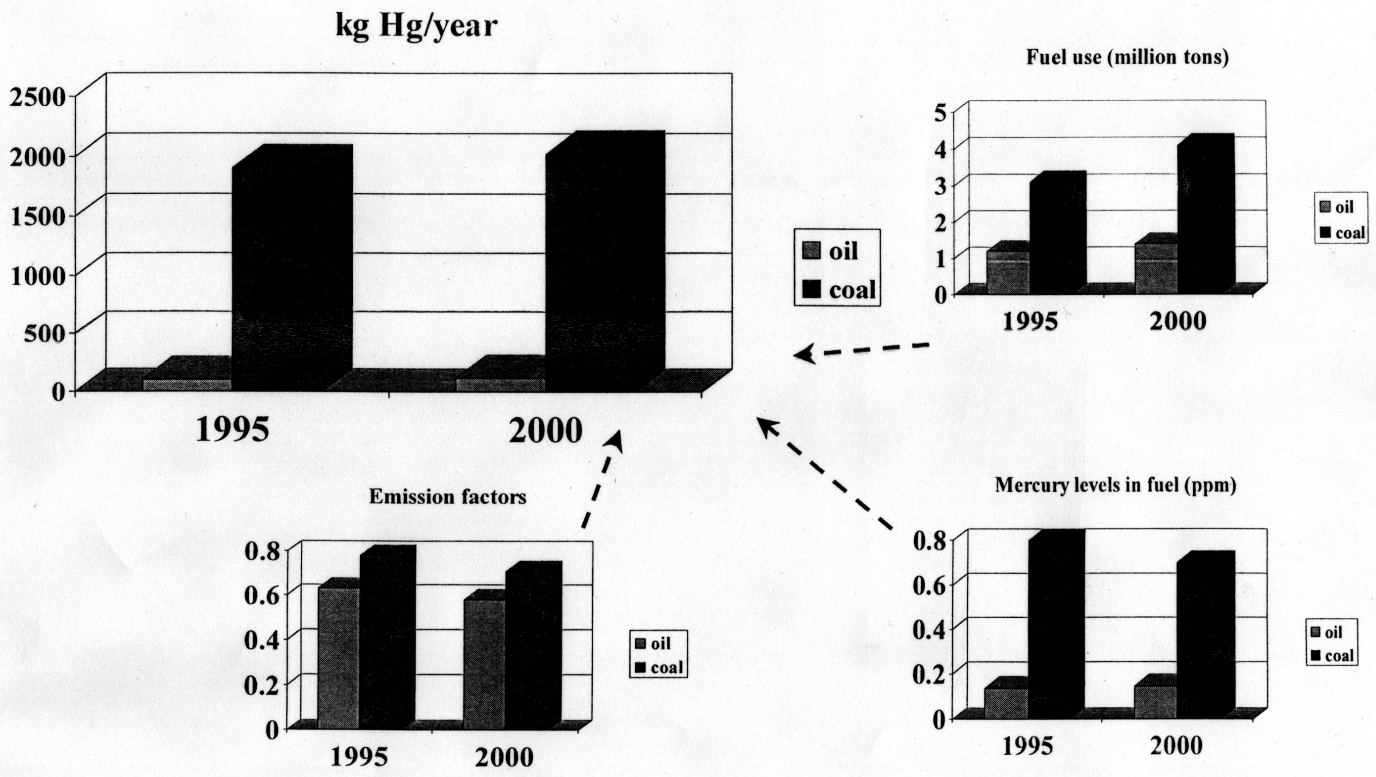
Framework Incorporating Recognized Hg Indicators



List of Objectives
(for using measures)

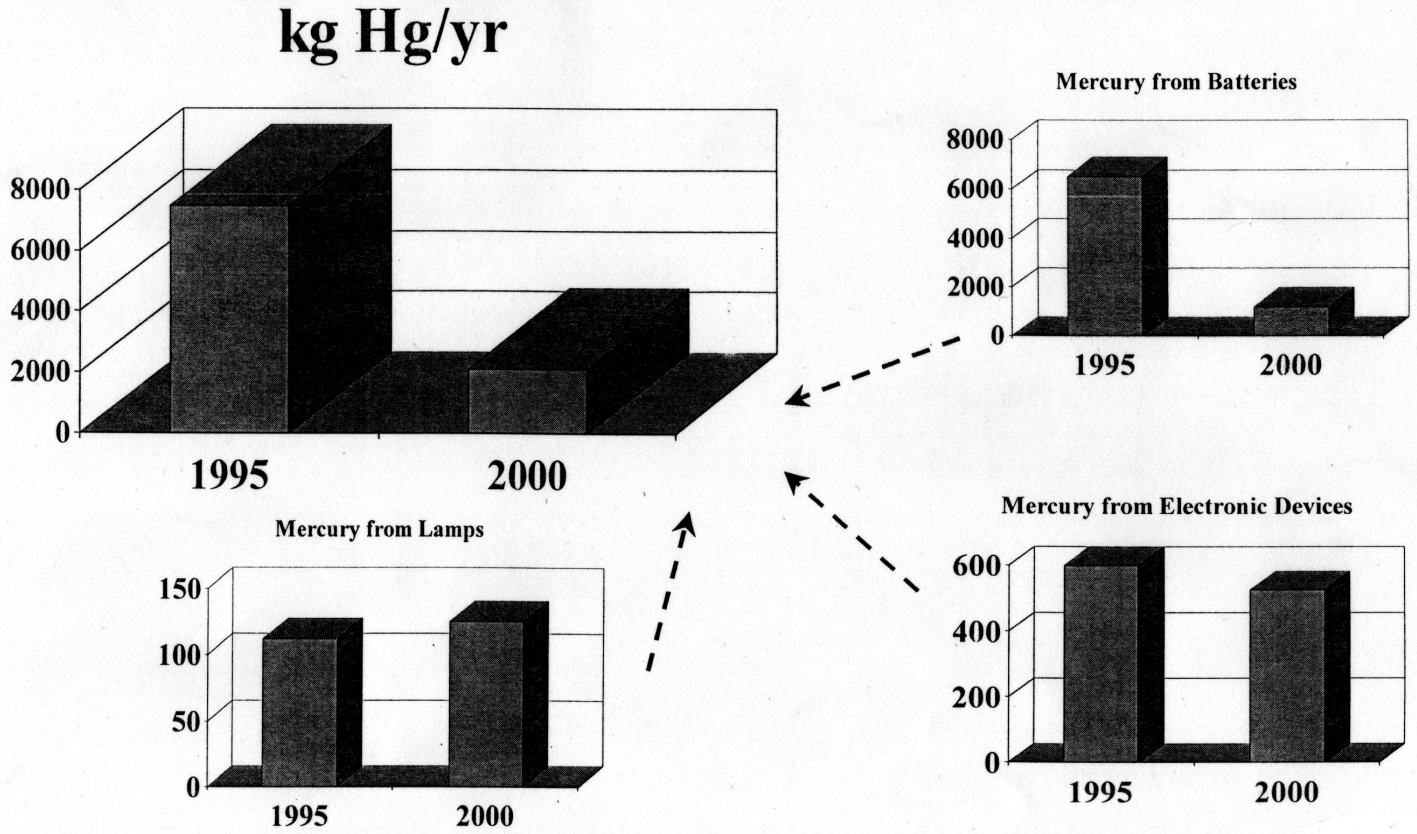
- Coordinate and prioritize the implementation of actions in the Plan
- Propose any necessary adjustments to the objectives and recommendations of the Plan
- Consider existing and proposed legislation rules and regulations
- Provide comments and recommendations on proposed federal standards and regulations

Utility Emissions (by fuel)

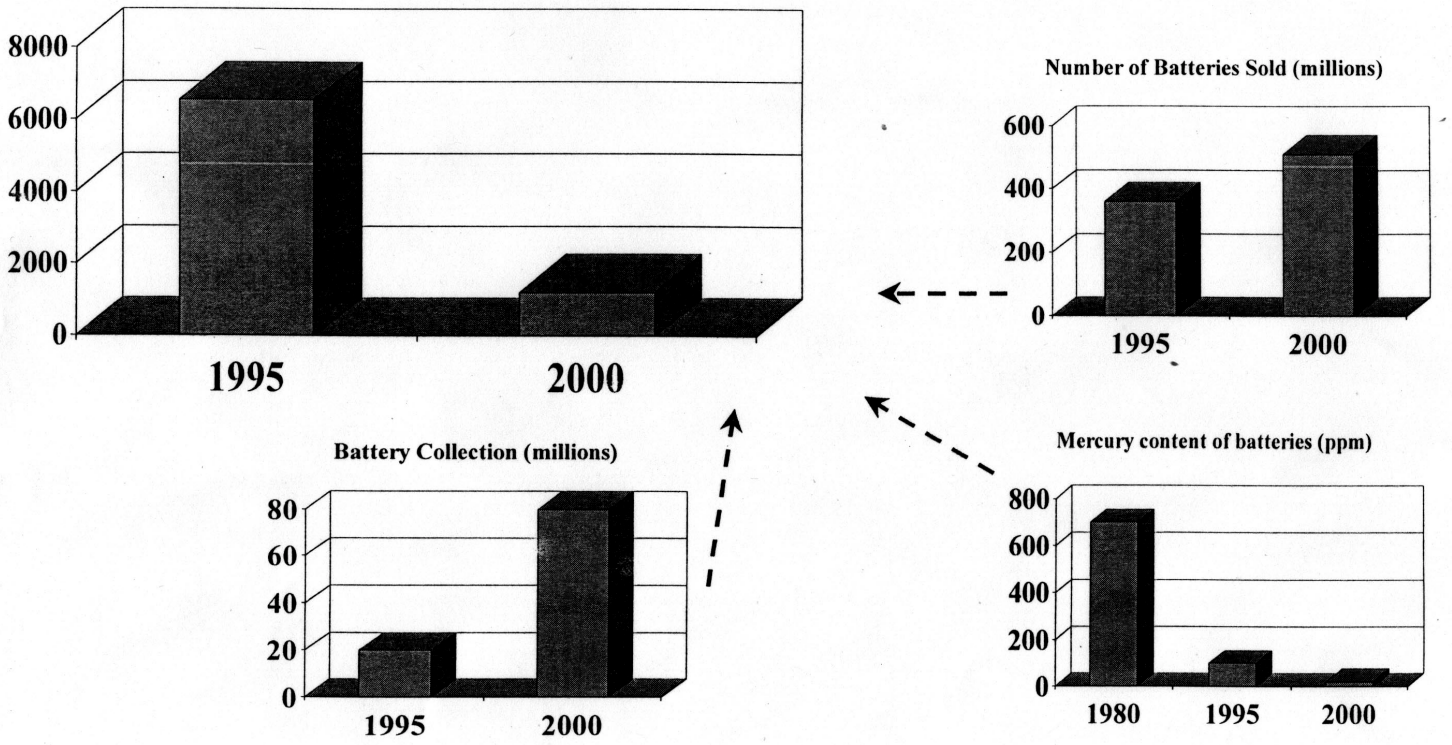


(The proportion of Hg released from fuels; the remainder being captured by pollution control devices.)

Solid Waste Incineration



Mercury from Battery Incineration

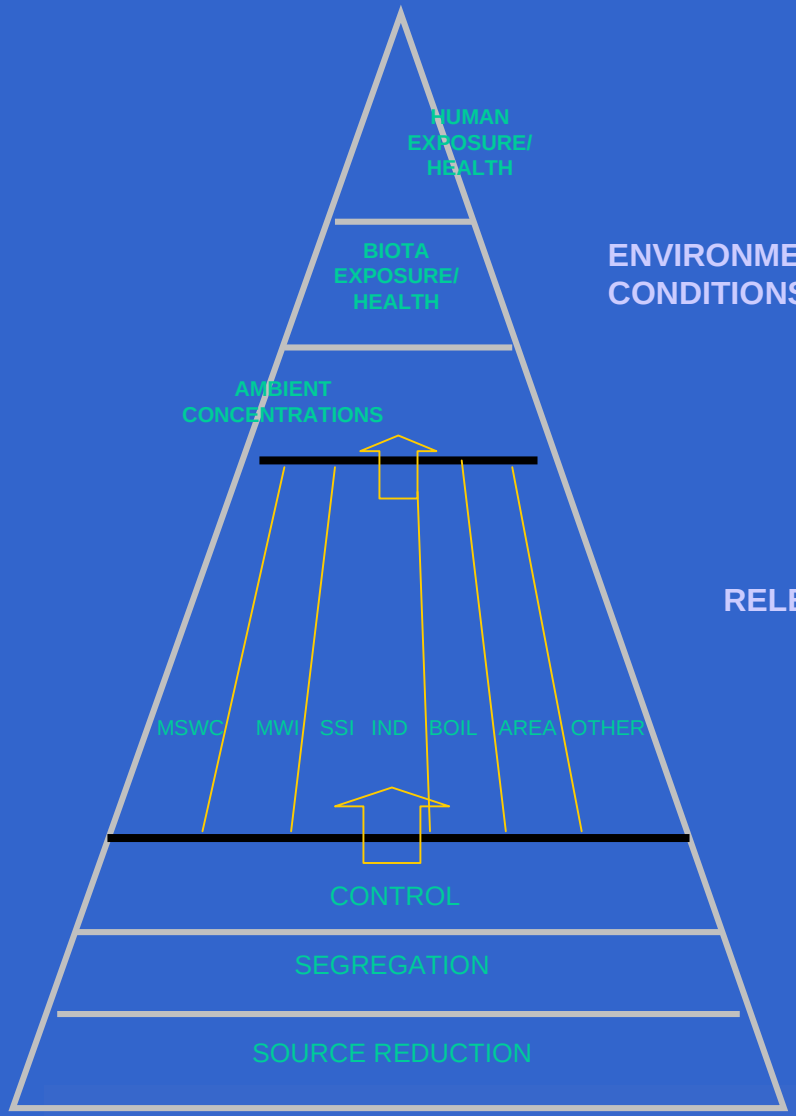


Conclusions

- Problems of multiple use
- Avoiding traditional measures selection
- Responsibility for reporting vs. responsibility for *performing*

Measures for the public

what is different



ENVIRONMENTAL CONDITIONS

RELEASES

ACTIVITIES

Measures for the public

what is different

- Smaller number of measures
- A message
  - "We're doing a great job" (i.e., what we do has XX environmental accomplishment)
  - "We're going to Hell in a handbasket" (i.e., we're doing all you're letting us, but...)

Measures for the public

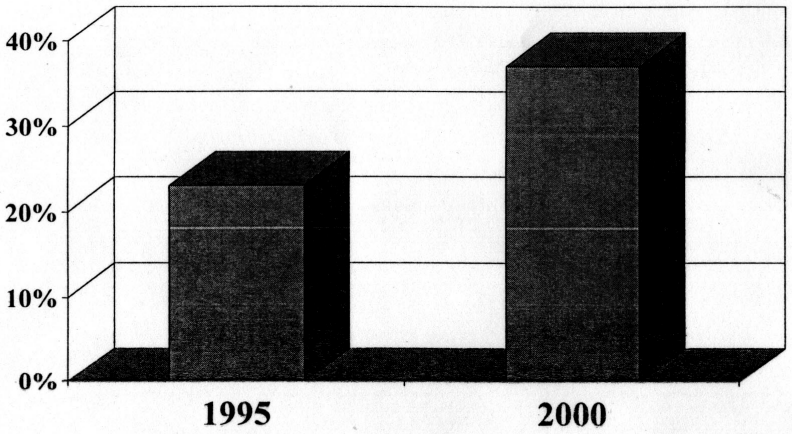
what is the same

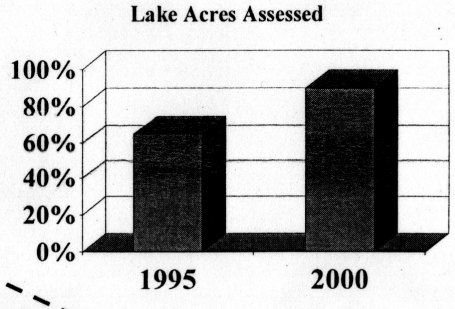
- Linking action to outcome

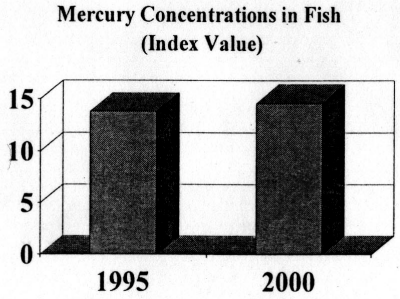
  ("We did X, it accomplished Y")

  ("We did all you let us, but...)

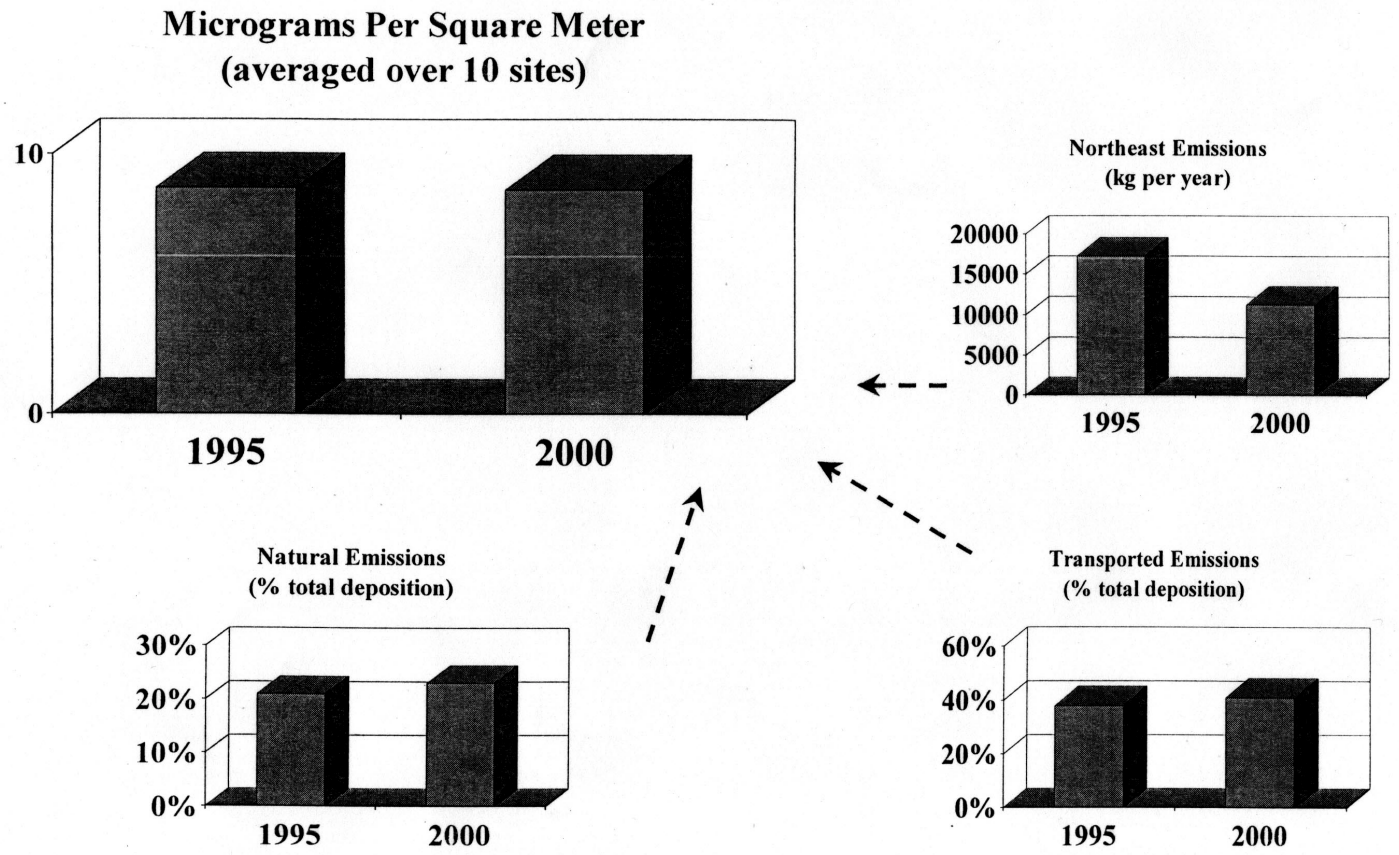
Fish Advisories (% lake acres)







Mercury Deposition



Conclusion

- Don’t sweat selection criteria
- Respect